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Oklahoma teachers attending workshops in the summers of 1965 and 1966 were not equally successful in initiating high school off-farm agricultural occupations programs even though the necessary competencies were attained. To determine relationships between teacher innovativeness and innovation diffusion, and to isolate variables associated with failure to adopt innovative programs, a diffusion scale, innovativeness scale, and administrator attitude scale were completed by interviewing each of the 32 teachers and their administrators. Diffusion of innovative practices was found to be significantly correlated with the number of teachers in a department, the number of students in a department, teacher innovativeness, and the number of non-farm agricultural students. The number of teachers in a department and teacher innovativeness accounted for nearly 52 of the 70 percent of the variance in the regression equation. Low correlations indicated the following factors did not seriously inhibit diffusion of cooperative agricultural occupations curricula: (1) administrator's attitude, (2) expenditure per pupil, (3) number of agricultural training stations available in the community, (4) offering of a separate agricultural mechanics class, and (5) the number of vocational education programs offered by the school. (DM)

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VARIABLES INFLUENCING TEACHER ADOPTION OF COOPERATIVE AGRICULTURAL OCCUPATIONS CURRICULA

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VARIABLES INFLUENCING TEACHER ADOPTION OF COOPERATIVE AGRICULTURAL OCCUPATIONS CURRICULA.

By

David L. Williams and William L. Hull

The research reported herein was performed as Project No. 7-G-052 under the title "Personal and Situational Variables Which Inhibit or Stimulate the Adoption of Agricultural Occupations Curricula as an Innovation in Vocational Agriculture by Institute Participants" pursuant to Contract No. OEG-17-070052-4587 with the Office of Education, U. S. Department of Health, Education, and Welfare.

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July, 1968

The Vocational Research Coordinating Unit,
and
The Department of Agricultural Education
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Introduction

The dynamic growth of agricultural industry has placed increased emphasis on technical proficiency. Personnel needs are complex requiring sophisticated knowledge of machines and processes. The pressing need in agricultural education is to supplement production agricultural training with experiences which will equip young people for non-professional, skilled, employment in off-farm agricultural occupations.

Training for off-farm agricultural occupations was legitimized by the 1963 Vocational Education Act. This legislation became a mandate for teachers to train not only future farmers but also persons who will be employed in agricultural businesses. To stimulate adoption of useful experience programs and to reduce the traditional time lag between research findings and adoption of new educational practices, frequently it is necessary to modify teacher knowledge and skills. Workshops, institutes, and other retraining programs have been conducted to stimulate teachers to adopt innovations that will more effectively meet the needs of their students.

In this regard, the Agricultural Education Department, Oklahoma State University, conducted an Institute, consisting of two workshops, during the summers of 1965 and 1966. The Institute was designed to train vocational agriculture teachers for conducting cooperative agricultural occupations training programs in secondary schools. Evidence available from the Institute indicates teachers mastered the competencies needed

to implement the innovation, yet their program outcomes appeared to vary greatly.[1] The problem with which this study was concerned is: Why were these teachers not equally successful? Either these teachers were not innovators, or situational variables in the community were so strong as to retard the adoption of the innovation.

Purpose of the Study

The purpose of this study was: (1) to determine the relationship between teacher innovativeness and diffusion of the innovation, and (2) to isolate and relate situational variables in the school and community which were associated with deviation from the expected result, adoption of the innovative program. A direct relationship between innovativeness of the teacher and degree of program adoption was hypothesized. Potential intervening variables considered in the study included:

A. Administrator's attitude toward cooperative agricultural occupations training

B. The school's per pupil expenditure

C. The number of agricultural training stations available in the community

D. The number of teachers in the vocational agriculture department

E. The number of students enrolled in vocational agriculture

F. The number of non-farm students enrolled in vocational agriculture

G. The number of vocational education programs offered by

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[1] William L. Hull, et al. Developing Occupational Experience Programs in Agricultural Distribution. (Stillwater, Oklahoma: Oklahoma State University Research Foundation, October, 1967), p. 18.

the school

H. The offering of a separate agricultural mechanics class in the vocational agriculture program

Procedure

Teachers included in the study were the thirty-two Oklahoma teachers participating in the Institute who were still teaching vocational agriculture in the same school as they were when enrolled in the Institute. Also included in the study was one administrator in each of the schools where these teachers were employed.

The study required the development of three major data-gathering instruments to be used in personal interviews. They included a diffusion scale, a teacher innovativeness scale, and an administrator's attitude scale. The procedure followed in constructing the instruments is discussed below.

Diffusion Scale. The diffusion scale was designed to measure the nature and extent of diffusion of cooperative agricultural occupations curricula into the vocational agriculture program. To select the items for the diffusion scale, 36 statements were formulated with each item describing one aspect of the innovation. A jury of five individuals knowledgeable of cooperative occupations training and the diffusion-adoption process was used to obtain ratings on each item. The jury classified each item along a five point diffusion continuum considering equal intervals between points. Classifying an item in the number 1 category meant that it exemplified conditions in a situation where only the earliest attempts were made to diffuse the concept into the program. Rating an item as number 5 meant that departments meeting this criteria

have completely incorporated the innovation into their program.

The 13 items selected for the diffusion scale included the ones with greatest agreement among the judges (responses were contained in three adjacent categories or less). Three items were selected as classroom exemplars, five items as school system exemplars, and five items as community exemplars. A mean rating for each of the items was determined by averaging the judges' responses. Through a personal interview with each teacher in his vocational agriculture department, each program received credit (mean rating) for items exemplifying its situation. In this manner, a total score representing the extent of innovation diffusion into the total vocational agriculture program was derived for each department.

Teacher Innovativeness Scale. The innovativeness scale, frequently referred to as a time scale, was developed to provide a means to measure the degree to which an individual is relatively earlier to adopt new ideas and practices than other teachers.

The initial steps in constructing the innovativeness scale was to identify educational innovations to be included which met the following criteria:

1. The practices were ones that could be adopted by the teacher rather than by the institution.
2. The practices were ones which would not be perceived as a major threat to existing practices.
3. The teacher was free to adopt or reject the practice himself without having to consider superior approval, budgetary limitations, school policies, or class schedule.

Practices identified from various sources were given to a trial group consisting of fifteen experienced Oklahoma vocational agriculture teachers. The practices selected for the innovativeness scale were most frequently identified by the trial group as not being adopted but applicable to vocational agriculture programs.

The final scale consisted of sixteen practices with three possible responses for each: (1) the date the innovation was first used, (2) the innovation does not apply, or (3) the innovation has not been adopted, but does apply. The "does not apply" response would indicate that a practice does not apply to the individual's situation, e.g., a practice pertaining to agricultural mechanics could not be adopted by a teacher who does not have a shop. A panel of judges consisting of teacher educators and vocational agriculture supervisors was used to establish a definite date when each practice became generally available to Oklahoma teachers.

The innovativeness score for each teacher was determined using the following formula developed by Christiansen[2] for use in a study of the adoption of educational innovations among Ohio teachers of vocational agriculture:

$$IS = \frac{tla + tlp}{Na} \times \frac{Mle}{Ye}$$

Where:

- tla: time lag expressed in years for all practices adopted by the individual teacher
- tlp: time lag penalty in years for remaining practices not adopted which could have been adopted
- Na: number of practices actually adopted
- Mle: maximum length of experience of any teacher investigated
- Ye: years of experience possessed by the individual teacher

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[2]James E. Christiansen. "The Adoption of Educational Innovations Among Teachers of Vocational Agriculture." (Unpub. Ph.D. dissertation, The Ohio State University, 1965), pp. 55-56.

In explaining this procedure, Christiansen[3] stated:

> The innovativeness score for each teacher equalled the summation of the time lag expressed in years for all practices adopted plus the summation of a time lag penalty expressed in years for each practice not adopted which could have been adopted divided by the sum of the number of practices adopted, the resulting figure, or base score, multiplied by an equalization factor.
> An equalization factor was necessary to prevent the teacher who began teaching most recently from receiving undue credit for practices already adopted when in reality (1) we did not know which of the remaining practices not currently adopted would be adopted in the future and (2) if they were adopted, what time lag would occur between the date when the practice could have been adopted and the date it actually would have been adopted. On the other hand, it was possible to collect this information for teachers who had been teaching for several years.

Administrator's Attitude Scale. A Likert-type scale was constructed following the procedure outlined by Edwards[4] to measure the attitude of the school administrator towards cooperative agricultural occupations training. Edwards[5] suggested that since each response to a statement may be considered a rating and because these are summated over all statements, the Likert method of scale construction has been commonly called the method of summated ratings.

Following a review of relevant literature, thirty-nine statements concerning agricultural occupations training were made. The statements were classified into two classes: favorable and unfavorable. The scale was statistically validated by obtaining responses from sixty-four undergraduate students enrolled in Agricultural Education 3103 at Oklahoma State University during the fall semester of 1967-68. In obtaining

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[3] Ibid.

[4] Allen L. Edwards. Techniques of Attitude Scale Construction. (New York: Appleton-Century-Crofts, Inc., 1957), pp. 149-157.

[5] Ibid.

responses from the trial group, they were instructed to mark each statement as strongly agree, agree, undecided, disagree, or strongly disagree.

These categories of response were weighted so that the response made by individuals with the most favorable attitudes received the highest possible weight. For the favorable statements, this was the "strongly agree" category, and for the unfavorable statements it was the "strongly disagree" category. A total score was obtained for each subject by summating his scores for the individual statements.

To evaluate the individual statements, twenty-five subjects with the highest total score and twenty-five subjects with the lowest total score were selected and the frequency distribution for each statement in each group determined. As a basis for rejecting statements in the scale, a form of item analysis, the t test, was utilized to select the statements that differentiated between the high and low groups. The 22 statements selected for the attitude scale had a t value of 1.80 or greater.

In addition to these three major instruments, interview schedules were constructed to assess variables related to the school, community, and the vocational agriculture department.

In collecting data for the study, each teacher was interviewed in his department. The personal interview and the visit in the vocational agriculture department permitted the investigator to observe practices being used by the teacher which were relevant to the study. The school administrator interviewed was the school official identified by the local superintendent of schools as being mainly charged with supervision of the vocational agriculture department. In all cases this was either the superintendent of schools or the high school principal. Data for the study were collected during the months of March and April, 1968.

Because of the nature of the study, at least two limitations should be recognized by the reader when interpreting the findings. They are as follows:

1. The study was based on an ex post facto design. Therefore, it was not possible to control or manipulate independent variables.
2. Since only nine elements were considered, the possible effect of other variables on the criterion is unknown.

Stepwise regression, a method of multiple regression calculation, was used in analyzing the data. This procedure included (1) the computation of simple correlation matrix, (2) the computation of partial and multiple correlation coefficients, and (3) the formulation of a multiple regression equation.

Findings of the Study

Findings of the study are presented in three sections, including the following: (1) intercorrelations among all variables included in the study; (2) relationship between the optimum composite of independent variables and the criterion; and (3) the formulation of a multiple regression equation that might be used in predicting the probable level of diffusion of cooperative agricultural occupations curricula into the program.

Intercorrelations Among All Variables. Table I shows the intercorrelations of the independent variables and dependent variable for the data obtained from the 32 schools included in the study. A coefficient of correlation of .449 is significant at the one percent level of confidence, and a coefficient of .349 is significant at the five

percent level of confidence for the number of cases considered in the study. In the intercorrelation table, involving forty-five correlations, eight correlations are significant at the one percent level of confidence, two are significant at the five percent level of confidence; and thirty-five correlations are not significant at the five percent level of confidence.

Four independent variables had a significant correlation with diffusion of the innovation. They included:

1. The number of vocational agriculture teachers employed by the school
2. The total number of students enrolled in vocational agriculture
3. Innovativeness of the teacher
4. The number of non-farm students enrolled in vocational agriculture

The number of vocational agriculture teachers employed by the school was most closely related to diffusion of cooperative agricultural occupations curricula. The coefficient of correlation was .603, which is significant at the one percent level of confidence.

Innovativeness of the teacher was also closely related to diffusion. The coefficient of correlation was -.510, which is significant at the one percent level of confidence. This correlation is negative because the lower the score, the more innovative the teacher. In other words, innovativeness is the average length of expired time (years) for a teacher to adopt an innovation.

The relationship that existed between the total number of students enrolled in the vocational agriculture program and diffusion was

TABLE I

INTERCORRELATION AMONG ALL VARIABLES INVESTIGATED IN THE STUDY

Variables	(Refer to Numbered Variables at Left of Table) 1	2	3	4	5	6	7	8	9	10
1. Diffusion		-.510**	.136	-.176	.344	.585**	.465**	.603**	.157	.200
2. Teacher Innovativeness			-.122	.059	-.262	-.221	-.139	-.217	-.344	-.121
3. Administrator's Attitude				.145	.135	-.221	-.252	-.012	.263	-.054
4. Per Pupil Expenditure					-.290	-.133	-.291	.033	-.046	-.165
5. Training Stations						.273	.254	.267	-.133	.460**
6. Vocational Agriculture Enrollment							.823**	.828**	.433*	.215
7. Non-Farm Enrollment								.515**	.248	.170
8. Teachers in Department									.375*	.292
9. Agricultural Mechanics Class										.032
10. Vocational Education Programs										

** Significant at the .01 level
* Significant at the .05 level

expressed by a coefficient of correlation of .585, which is significant at the one percent level of confidence. A coefficient of correlation of .465 existed between the number of non-farm students enrolled in vocational agriculture and diffusion of the innovation, which is also significant at the one percent level of confidence.

In addition to showing the variables that are significantly correlated with diffusion, the intercorrelation matrix shows that several of the variables had only very slight relationships with the dependent variable. Of all the independent variables, the administrator's attitude toward agricultural occupations training had the least relationship (.136) with diffusion. This low correlation may be expected because almost all administrators were highly favorable to the innovation.

Other independent variables which were not significantly related to the dependent variable included: (1) offering of separate agricultural mechanics class (.157), (2) school's per pupil expenditure (-.176), (3) number of vocational education training programs offered by the school (.200), and (4) the number of agricultural training stations available in the community (.344).

The intercorrelation matrix also shows the relationship existing among independent variables included in the study. The coefficient of correlation of .460 obtained between the number of agricultural training stations available in the community and the number of vocational education training programs offered by the school, was significant at the one percent level of confidence.

Variables significantly related to the number of students enrolled in vocational agriculture and their coefficients of correlation are: (1) number of non-farm students enrolled in vocational agriculture, .823;

(2) number of teachers employed in the vocational agriculture department, .828; and (3) the offering of a separate agricultural mechanics class in the vocational agriculture department, .433. The first two are significant at the one percent level of confidence, and the last at the five percent level of confidence.

The number of non-farm students enrolled in vocational agriculture is closely related to the number of teachers of vocational agriculture employed by the school. The coefficient of correlation is .515, which is significant at the one percent level of confidence.

The relationship existing between the number of teachers employed in the vocational agriculture department and the offering of a separate agricultural mechanics class in the vocational agriculture department is expressed by a coefficient of correlation of .375, which is significant at the five percent level of confidence.

Relationship Between a Composite of Variables and the Criterion. A multiple regression analysis was used to select the combination of independent variables which accounted for the greatest amount of variation in the criterion. Machine analyses determined the order of entry of variables into the regression equation.

Table II reports the results of applying a multiple regression analysis technique to the data with diffusion of the innovation serving as the criterion. Data in the table show the extent to which the variation away from the mean diffusion score was explained by the independent variables. The variables as listed accounted for 70 percent of the variation.

The number of teachers in the vocational agriculture department accounted for 36.4 percent of the variation in diffusion of the innovation.

This one variable accounted for slightly more than one-half of all the variation accounted for by all nine independent variables considered in the study.

Innovativeness of the teacher claimed an additional 15.2 percent of the variation. Additional variation accounted for by other independent variables, in the order they were entered into the multiple regression equation, are: (1) offering of separate agricultural mechanics class, 3.8 percent; (2) number of non-farm students enrolled in vocational agriculture, 3.1 percent; (3) administrator's attitude toward the innovation, 5.0 percent; (4) number of students enrolled in vocational agriculture, 1.9 percent; (5) school's per pupil expenditure, 2.3 percent; and (6) the number of training stations available in the community, 2.4 percent.

The number of vocational education programs offered by the school did not account for any of the variation. Therefore, it is of doubtful value as a predictor of diffusion of cooperative agricultural occupations curricula.

The Multiple Regression Equation. The final part of the study was the formulation of a multiple regression equation which could be useful as an aid in predicting diffusion of cooperative agricultural occupations curricula into a program.

When all independent variables are considered, except the number of vocational education programs offered by the school which did not account for any of the variation in the criterion, the multiple regression equation in score form is as follows:

$$Y' = -.875X_1 + .883X_2 - .057X_3 - .383X_4 + .415X_5 - .043X_6 + 3.316X_7 + 8.063X_8 - 7.794$$

TABLE II

RESULTS OF REGRESSION ANALYSIS

Order of Entry into Regression Analysis	Variable Name	Computed R	Cumulative Percentage of Variance Accounted for by R
1	Number of Teachers	.603	36.4
2	Innovativeness of Teacher	.718	51.6
3	Offering of Agricultural Mechanics	.744	55.4
4	Non-farm Enrollment	.765	58.5
5	Administrator's Attitude	.797	63.5
6	Enrollment in Vocational Agriculture	.809	65.4
7	Expenditures per Pupil	.823	67.7
8	Number of Training Stations	.837	70.1
9	Number of Vocational Programs	.837	70.1

The values -.875, .883, . . . 8.063 are the score weights (constants) by which the independent variables are multiplied. The variables are identified as follows:

Y' - Predicted diffusion score

X_1 - Teacher innovativeness score

X_2 - Administrator's attitude score toward cooperative agricultural occupations training

X_3 - School's per pupil expenditure

X_4 - Number of training stations available in the community

X_5 - Number of students enrolled in vocational agriculture

X_6 - Number of non-farm students enrolled in vocational agriculture

X_7 - Number of teachers in the vocational agriculture department (use -1 for only one teacher and +1 for two or more teachers)

X_8 - Offering of separate agricultural mechanics class in the vocational agriculture department (use -1 for yes and +1 for no)

These products and the constant, -7.794, are summed algebraically resulting in Y', the predicted diffusion score.

The accuracy with which it is possible to predict criterion scores using the regression equation is indicated by the standard error of estimate. The standard error of estimate associated with the regression equation is 9.827 . This means that the chances are two in three that a predicted diffusion score will not miss the actual score by more than $\pm$ 9.827. In general, about two-thirds of all predicted adoption scores will lie within $\pm$ 9.827 points of their earned values.

The regression equation appears to be useful as one tool in predicting diffusion of cooperative agricultural occupations curricula into a vocational agriculture program in Oklahoma. The equation may or may not be useful in other states.

Conclusions

The following conclusions, based on the findings of this study, emerge as being of particular importance:

1. Schools with a multiple-teacher vocational agriculture department will probably be more successful in the implementation of cooperative agricultural occupations curricula than schools with single-teacher departments.

2. The more students enrolled in vocational agriculture, the greater the probability of cooperative agricultural occupations curricula being diffused into the program.
3. The more innovative the teacher of vocational agriculture, the greater the probability of cooperative agricultural occupations curricula being diffused into the program.
4. The more non-farm students enrolled in vocational agriculture, the greater the probability of cooperative agricultural occupations curricula being diffused into the program.
5. Since school administrators in general have a favorable attitude toward cooperative agricultural occupations training, it does not appear to be a serious threat to diffusion of cooperative agricultural occupations curricula. However, since administrator's attitude accounted for 5.0 percent of the variation in the criterion, it should be considered when predicting diffusion of cooperative agricultural occupations curricula into a vocational agriculture program.
6. The number of agricultural training stations available in the community, school's per pupil expenditure, and the offering of a separate agricultural mechanics class were not significantly related to diffusion of cooperative agricultural occupations curricula. However, since they accounted for additional variation in the criterion, and since this information is easily obtainable, they should be considered when predicting diffusion of cooperative

agricultural occupations curricula.

7. The number of vocational education programs offered by the school is of doubtful value in predicting diffusion of cooperative agricultural occupations curricula.
8. A composite of the number of teachers in the vocational agriculture department, innovativeness of the teacher, offering of a separate agricultural mechanics course, number of non-farm students enrolled in vocational agriculture, administrator's attitude toward cooperative agricultural occupations training, enrollment in vocational agriculture, per pupil expenditure, and the number of agricultural training stations available in the community may be used effectively in predicting diffusion of cooperative agricultural occupations curricula.
9. There was a significant correlation between four of the variables studied and diffusion which indicates that these factors do stimulate diffusion of cooperative agricultural occupations curricula. In order of importance, the variables are: (1) number of teachers in the vocational agriculture department, (2) number of students enrolled in vocational agriculture, (3) innovativeness of the teacher, and (4) number of non-farm students enrolled in vocational agriculture.
10. There was little correlation between five of the variables considered in the study and diffusion which indicates that these factors have not seriously inhibited the diffusion of cooperative agricultural occupations curricula. These

variables are: (1) administrator's attitude, (2) expenditure per pupil, (3) number of agricultural training stations available in the community, (4) offering of a separate agricultural mechanics class, and (5) number of vocational education programs offered by the school.

Implications

Findings of the study reveal that certain personal and situational variables are associated with diffusion of cooperative agricultural occupations curricula into a vocational agriculture program.

It is the opinion of the investigators that the following statements should be given consideration by those who are responsible for promoting the implementation of cooperative agricultural occupations curricula:

1. A greater number of multiple-teacher departments need to be established to effectively expand the vocational agriculture program by adding cooperative agricultural occupations curricula.
2. State staff personnel and in-service teacher trainers should consciously and deliberately identify and use the more innovative teachers of vocational agriculture to conduct pilot cooperative agricultural occupations training programs, and other purposeful changes in agricultural education.
3. Schools with large enrollments in vocational agriculture, and large non-farm enrollments, should be encouraged to supplement traditional agricultural production curricula

with cooperative agricultural occupations training.

4. School administrators should be included in planning cooperative agricultural occupations training experiences and other innovations in agricultural education.
5. Since several of the teachers indicated they did not have sufficient help and encouragement to implement the innovation, perhaps state staff personnel should be more positive in their recommendations and exert greater leadership in actively promoting adoption of cooperative agricultural occupations curricula as a supplement to the total vocational agriculture program.
6. Schools which have successfully implemented cooperative agricultural occupations curricula should be identified and used as demonstration centers to encourage adoption by other schools.
7. To speed the adoption of cooperative agricultural occupations curricula, some means of providing incentives is needed. Perhaps, this could be in the form of student recognition for accomplishments in cooperative agricultural occupations experience programs similar to recognition given to students with outstanding supervised farming programs.
8. Institutes and other in-service training programs attempting to introduce innovations into the vocational agriculture target system should use objective means of selecting participants to enhance adoption of new ideas.
9. Development of instructional material for classroom use

in preparing students for off-farm agricultural occupations may encourage adoption of cooperative agricultural occupations curricula.

10. Supervised training in off-farm agricultural occupations should be provided for vocational agriculture enrollees who do not have adequate home opportunities for supervised experiences in production agriculture.

11. Greater articulation and educator cooperation among vocational education programs on the state and local levels may speed adoption of innovations in vocational education and make the change process less haphazard.

12. Further research relating the diffusion and adoption processes to change and innovations in agricultural education is needed.

13. Additional research is needed to identify other factors, and to reinforce findings of this study, which stimulate and inhibit the adoption of cooperative agricultural occupations curricula and other innovations in agricultural education.

SELECTED BIBLIOGRAPHY

Arnold, W. M. "Questions and Answers on the Vocational Education Act of 1963," The Agricultural Education Magazine, XXXVIII. (July, 1965), 4-5, 21.

Bail, Joe P. and William H. Hamilton. A Study of the Innovative Aspects of Meeting Off-Farm Agricultural Programs at the Secondary Level and the Articulation of Such Programs with Technical College Curriculum in Agriculture. Ithaca, New York: Cornell University, Agricultural Education Division, College of Agriculture.(February, 1967).

Baker, Richard. "Curriculum for the World of Work," The Agricultural Education Magazine, XXXIX. (July, 1966), 6-9.

Barnett, H. G. Innovation: The Basis of Culture Change. New York: McGraw-Hill Book Co., Inc. (1953).

Binkley, Harold L. "Guidelines are Basic," The Agricultural Education Magazine, XXXIX.(July, 1966) 14-15.

Brickell, Harry M. Organizing New York State for Educational Change. New York: State Educational Department (1961).

Burt, Samuel M. "Industry Participation in Local Vocational and Technical Education Programs," Research in Vocational and Technical Education. Madison: Center for Studies in Vocational and Technical Education, The University of Wisconsin. (1967) 223-234.

Carlson, R. O. Adoption of Educational Innovations. The Center for the Advanced Study of Educational Administration. Eugene, Oregon: University of Oregon. (1965).

Carlson, Richard O. "Barriers to Change in Public Schools," Change Processes in the Public Schools. The Center for the Advanced Study of Educational Administration. Eugene, Oregon: University of Oregon. (1965).

Chesler, Mark and Robert Fox. "Teacher Peer Relations and Educational Change," NEA Journal, LVI. (May, 1967) 25-26.

Christiansen, James E. "The Adoption of Educational Innovations Among Teachers of Vocational Agriculture." (Unpub. Ph.D. dissertation, The Ohio State University, 1965).

Conant, James B. Shaping Educational Policy. New York: McGraw-Hill Book Company, Inc. (1964).

Copp, James H., Maurice L. Sill, and Emory J. Brown. "The Function of Information Sources in the Farm Practice Adoption Process," Rural Sociology, XXIII. (June, 1958) 146-157.

Demeter, Lee H. "Accelerating the Local Use of Improved Educational Practices in School Systems." (Unpub. Ed.D. thesis, Columbia University Teachers College, 1951).

Dinkmeyer, Don. "How Do You Think of Yourself as a Teacher," Instructor, LXXIV. (September, 1964) 11-12.

Draper, N. R. and H. Smith. Applied Regression Analysis. New York: John Wiley and Sons, Inc. (1968).

Dupy, Cleo A. and William L. Hull. Problems of Implementing Agricultural Occupations Programs in Twenty-Eight Selected Vocational Agriculture Departments. Research Bulletin Number 8. Stillwater, Oklahoma: The Vocational Research Coordinating Unit and The Department of Agricultural Education, Oklahoma State University. (October, 1966).

"Education for a Changing World of Work," Manpower in Farming and Related Occupations. Appendix II, Report of the Panel of Consultants on Vocational Education, Office of Education, U. S. Department of Health, Education, and Welfare.

Edwards, Allen L. Techniques of Attitude Scale Construction. New York: Appleton-Century-Crofts, Inc. (1957).

Eichholz, Gerhard and Everett M. Rogers. "Resistance to the Adoption of Audio-Visual Aids by Elementary School Teachers: Contrasts and Similarities to Agricultural Innovation," Adoption of Educational Innovations. Ed. Matthew B. Miles. New York: Bureau of Publications, Teachers College, Columbia University. (1964) 299-316.

Estes, Nolan. "Encouragement for Innovation," NEA Journal, LLV. (December, 1966) 30-32.

Evans, Luther H. and George E. Arnstein. "Background of the Symposium," Automation and the Challenge to Education. Proceedings of a Symposium. Ed. Luther H. Evans and George E. Arnstein. Washington: National Education Association. (1962).

Fawcett, Claude W. "Responsibilities of Nonpublic Agencies for Conducting Vocational Education," Vocational Education. The Sixty-Fourth Yearbook of the National Society for the Study of Education. Ed. Melvin L. Barlow. Chicago: The University of Chicago Press. (1965) 244-262.

Gallaher, A. T., Jr. "Directed Change in Formal Organizations: The School System," Change Processes in the Public Schools. The Center for the Advanced Study of Educational Administration. Eugene, Oregon: University of Oregon. (1965) 37-51.

Gardner, John W. Self-Renewal--The Individual and the Innovative Society. New York: Harper and Row, Publishers. (1965).

Garrett, Henry E. Statistics in Psychology and Education. New York: Longman's Green and Co. (1958).

Glines, Don. "Changing a School," Phi Delta Kappan, XLVIII, 4. (December, 1966) 166-168.

Hathaway, Dale E. Problems of Progress in the Agricultural Economy. Chicago: Scott, Foresman and Company. (1964).

Hobbs, Daryl. "Facilitating the Change Process in Agricultural Education," Report of a National Seminar on Agricultural Education--Program Development and Research. The Center for Research and Leadership Development in Vocational and Technical Education. Columbus: The Ohio State University. (August, 1965).

Hull, William L. "Curriculum Innovation Depends on Teacher Initiative," The Agricultural Education Magazine, XXXX. (October, 1967) 78-79.

Hull, William L., Marsena M. Norris, and Cleo A. Dupy. Developing Occupational Experience Programs in Agricultural Distribution. Stillwater, Oklahoma: Research Foundation, Oklahoma State University. (October, 1967).

Joint Committee of the U. S. Office of Education and the American Vocational Association. Objectives for Vocational and Technical Education in Agriculture. U. S. Department of Health, Education, and Welfare, Office of Education. Washington: U. S. Government Printing Office. (1966).

Kerlinger, Fred N. Foundations of Behavioral Research. New York: Holt, Rhinehart and Winston, Inc. (1966).

Lancaster, Stan D. "Developing Occupations Programs in Off-Farm Occupations," The Agricultural Education Magazine, XXXVIII. (1961) 78, 94.

Lee, Allen. Report of the Illinois Occupational Research and Development Coordinating Unit (RCU) Workshop for Vocational Education. Ed. Robert A. Campbell. Springfield, Illinois: Illinois RCU, Board of Vocational Education and Rehabilitation. (1966).

Lionberger, H. F. Adoption of New Ideas and Practices. Ames: The Iowa State University Press. (1960).

Linson, Marvin G. "State Leadership Responsibilities in Planning and Conducting Pilot Programs," Report of a National Seminar on Agricultural Education Program Development and Research. Columbus: The Ohio State University, Center for Vocational and Technical Education. (August, 1965) 103-115.

McComas, James D. "The Role of the Teacher of Vocational Agriculture as Perceived by Selected Ohio Teachers and Their Administrators." (Unpub. doctoral thesis, Columbus, Ohio, The Ohio State University, 1962).

Mackenzie, Gordon N. "The Process of Innovation," NEA Journal, LVI. (May, 1967) 27-32.

Mason, Robert G. "The Use of Information Sources in the Adoption Process," Rural Sociology, XXXIX. (March, 1964) 40-52.

Mason, Ralph E. and Peter G. Haines. Cooperative Occupational Education and Work Experience in the Curriculum. Danville, Illinois: The Interstate Printers and Publishers, Inc. (1965).

Miller, Texton R. Teacher Adoption of a New Concept of Supervised Practice in Agriculture. A Report of Research Conducted by the Department of Agricultural Education. Raleigh: North Carolina State University. (October, 1965).

Mobley, Mayor D. and Melvin L. Barlow, ed. "Impact of Federal Legislation and Policies upon Vocational Education," Vocational Education. The Sixty-Fourth Yearbook of the National Society for the Study of Education. Chicago: The University of Chicago Press. (1965) 186-202.

Moeller, Don. "A Look at Youth Training in Agriculture," The Agricultural Education Magazine, XXXIX. (February, 1967) 173-174.

Mort, Paul. "Studies in Educational Innovation from the Institute of Administrative Research: An Overview," Innovation in Education. Ed. Matthew B. Miles. New York: Colubmia University Teachers College. (1964) 317-328.

Mort, Paul R. and Francis G. Cornell. Adaptability of Public School Systems. New York: Columbia University Teachers College, Bureau of Publication. (1938).

Pearce, Frank C. "Experience Programs are Better than Supervised Farming," The Agricultural Education Magazine, XXXVIII. (September, 1965) 60.

Phipps, Lloyd J. Handbook on Agricultural Education in Public Schools. Danville, Illinois: The Interstate Printers and Publishers, Inc. (1965).

Rivlin, Alice M. "An Economist Looks at Vocational Education," American Vocational Journal. (December, 1965) 9-10.

Rogers, E. M. Diffusion of Innovations. New York: The Free Press of Glencoe. (1962).

Rogers, Everett M. "What are Innovators Like," Change Processes in the Public Schools. The Center for the Advanced Study of Educational Administration. Eugene, Oregon: University of Oregon. (1965) 55-61.

Rogers, Everett M. "The Adoption Period," Rural Sociology, XXVI. (1961) 77-82.

Rogers, Everett M., A. Eugene Havens, and David G. Cartano. The Construction of Innovativeness Scales. Department of Agricultural Economics and Rural Sociology, Mimeo Bulletin A. E. 330. Columbus: Ohio Agricultural Experiment Station (February, 1962).

Rogers, Everett M. and Edna L. Rogers. "A Methodological Analysis of Adoption Scales," Rural Sociology, 16. (December, 1961) 325-336.

Ross, Donald H. Administration for Adaptability: A Source Book Drawing Together the Results of More Than 150 Individual Studies Related to the Question of Why and How Schools Improve. New York: Metropolitan School Study Council. (1958).

Sharp, Laure M. and Rebecca Krasnegor. The Use of Follow-Up Studies in the Evaluation of Vocational Education. Washington: Bureau of Social Science Research, Inc. (1966).

Stevenson, William W. A Study of Employment Opportunities and Training Needs in Off-Farm Agricultural Occupations in Oklahoma. Stillwater: Oklahoma State University. (1965).

Subcommittee for the Study of Diffusion of Farm Practices. Adoption of New Farm Ideas: Characteristics and Communications Behavior. North Central Regional Extension Publication 13. East Lansing: Cooperative Extension Service, Michigan State University. (n.d.).

Subcommittee for the Study of Diffusion of Farm Practices. How Farm People Accept New Ideas. North Central Regional Extension Publication 1. Ames: Agricultural Extension Service, Iowa State College. (1962).

Summary of Research Findings in Off-Farm Agriculture Occupations. The Center for Research and Leadership Development in Vocational and Technical Education, Agdex 900. Columbus: The Ohio State University. (August, 1965).

Sweatman, Charles. "Operation: New Outlook," The Clearing House, XLI. (October, 1966) 66-73.

Thurstone, Louis L. The Measurement of Values. Chicago: University of Chicago. (1959).

Tope, Donald E. "Summary of Seminar on Change Processes in the Public Schools," Change Processes in the Public Schools. The Center for the Advanced Study of Educational Administration. Eugene, Oregon: University of Oregon. (1965) 89-92.

University of Arkansas, College of Education. Supervised Occupational Experience Program in Vocational Agriculture for Arkansas. Department of Vocational Teacher Education in Cooperation with Arkansas State Department of Education, Division of Vocational Education. Fayetteville: The University of Arkansas. (1967).

U. S. Department of Health, Education, and Welfare. Developing Supervised Occupational Experiences in Agriculture: A Suggested Secondary School Guide. Storrs, Connecticut: The University of Connecticut. (1967).

Venn, Grant. "Occupational Education--A Lifetime Concern," American Vocational Journal, XLI. (November, 1966) 16-17.

Vocational Education Research Coordinating Unit, State of Michigan. A Study of the Diffusion Process of Vocational Education Innovations. Lansing: State Board of Education, Department of Education. (1967).

Walsh, John P. and William Selden. "Vocational Education in the Secondary School," Vocational Education. The Sixty-Fourth Yearbook of the National Society for the Study of Education. Ed. Melvin L. Barlow. Chicago: The University of Chicago Press. (1965) 88-134.

Warmbrod, J. Robert and Lloyd J. Phipps. Review and Synthesis of Research in Agricultural Education. The Center for Research and Leadership Development in Vocational and Technical Education. Columbus: The Ohio State University. (1966).

Wilson, B. R. "The Teacher's Role--A Sociological Analysis," British Journal of Sociology, XIII. (1962) 15-32.

Zander, Alvin. "Resistance to Change: Its Analysis and Prevention," Advanced Management, XV. (January, 1950) 9-11.

ATTACHMENT

Attached is a copy of a paper prepared for the Southern Research Conference in Agricultural Education, Oklahoma State University, Stillwater, Oklahoma, July 31, 1968. The paper contains graphs and charts which will help to visualize the relationship between independent variables considered in this study and diffusion of cooperative agricultural occupations curricula.

VARIABLES INFLUENCING TEACHER ADOPTION OF COOPERATIVE AGRICULTURAL OCCUPATIONS CURRICULA

by

David L. Williams
Vocational Research Coordinating Unit
Oklahoma State University

A major responsibility of teacher educators and supervisors in agricultural education is to help keep vocational agriculture programs in tune with rapid changes taking place in our dynamic society. With a reduction in the need for personnel in production agriculture, the pressing need in agricultural education is to supplement production agricultural training with experiences which will equip young people for non-professional, skilled employment in off-farm agricultural occupations.

For changes to take place in local departments of vocational agriculture, it is frequently necessary to modify teacher knowledge and skills. In this regard, teacher educators and supervisors can initiate and conduct retraining programs, such as workshops, institutes, and other inservice activities. Retraining programs could serve as one means to stimulate and train teachers to adopt innovations that will more effectively meet the needs of their clientele.

In keeping with the theme for this conference "Research in Understanding and Implementing Change in Agricultural Education," attention is focused on variables influencing teacher adoption of cooperative agricultural occupations curricula as revealed by one study conducted in Oklahoma. To understand the objectives of this study, it will be necessary to digress for a moment to look at some background information.

During 1965 and 1966, the Agricultural Education Department, Oklahoma State University, conducted an Institute consisting of two summer workshops to train sixty vocational agriculture teachers for conducting cooperative agricultural occupations training programs in secondary schools. Evidence available from the Institute indicates teachers mastered the competencies needed to implement cooperative agricultural occupations curricula, yet their program outcomes appeared to vary greatly.[1]

The problem with which this study was concerned is: Why were these teachers not equally successful after receiving the same re-training? Consequently, this study was designed to: (1) determine the relationship between teacher innovativeness and diffusion of cooperative agricultural occupations curricula into the vocational agriculture program, and (2) isolate and relate situational variables in the school and community which were associated with deviation from the expected result, adoption of the innovative program. A direct relationship between innovativeness of the teacher and degree of program adoption was hypothesized. Potential intervening variables considered in this study included:

A. Administrator's attitude toward cooperative agricultural occupations training

B. The school's per pupil expenditure

C. The number of agricultural training stations available in the community

D. The number of teachers in the vocational agriculture department

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[1]William L. Hull, et al. Developing Occupational Experience Programs in Agricultural Distribution. Stillwater, Oklahoma: Oklahome State University Research Foundation, October, 1967, p. 18.

E. The number of students enrolled in vocational agriculture

F. The number of non-farm students enrolled in vocational agriculture

G. The number of vocational education programs offered by the school

H. The offering of a separate agricultural mechanics class in the vocational agriculture program.

Teachers included in the study were the thirty-two Oklahoma teachers participating in the Institute who were still teaching vocational agriculture in the same school as they were when enrolled in the Institute. Also included in the study was one administrator in each of the schools where these teachers were employed.

The study required the development of three major data-gathering instruments to be used in personal interviews. They included a diffusion scale, a teacher innovativeness scale, and an administrator's attitude scale. Since the diffusion scale served as the criterion measure for the study, its construction will be presented in some detail.

The diffusion scale was designed to measure the nature and extent of diffusion of cooperative agricultural occupations curricula into the vocational agriculture program. To select the items for the diffusion scale, 36 statements were formulated with each item describing one aspect of the innovation. A jury of five individuals knowledgeable of cooperative occupations training and the diffusion-adoption process was used to obtain ratings on each item. The jury classified each item along a five point diffusion continuum considering equal intervals between points. Classifying an item in the number 1 category meant that it exemplified conditions in a situation where only the earliest attempts were made to diffuse the concept into the program. Rating an item as number 5 meant that programs meeting this criteria have

completely incorporated the innovation into their program.

The 13 items selected for the diffusion scale included the ones with greatest agreement among the judges; that is, responses were contained in three adjacent categories or less. Three items were selected as classroom exemplars, five items as school system exemplars, and five items as community exemplars. A mean rating for each of the items was determined by averaging the judges' responses. Through a personal interview with each teacher in his vocational agriculture department, each program received credit (mean rating) for items exemplifying its situation. In this manner, a total score representing the extent of innovation diffusion into the total vocational agriculture program was derived for each department.

The innovativeness scale, frequently referred to as a time scale, was developed to provide a means to measure the degree to which an individual is relatively earlier to adopt new ideas and practices than other teachers. To determine the innovativeness score for each teacher, a procedure developed by Christiansen[2] for use in a study of the adoption of educational innovations among Ohio teachers of vocational agriculture was used. By considering the length of time it took a teacher to adopt an innovation and the number of innovations adopted that were applicable to his situation, an innovativeness score was determined for each teacher.

To measure the administrator's attitude toward cooperative agricultural occupations training, a Likert-type scale was constructed. This scale, consisting of statements concerning cooperative agricultural

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[2]James E. Christiansen. "The Adoption of Educational Innovations Among Teachers of Vocational Agriculture." (Unpub. Ph.D. dissertation, The Ohio State University, 1965), pp. 55-56.

occupations training, was constructed so that the response made by individuals with the most favorable attitudes received the highest possible weight. For each administrator, a total score was obtained by summating his scores for the individual items.

In addition to these three major instruments, interview schedules were constructed to assess variables related to the school, community, and the vocational agriculture department.

Because of the nature of this study, at least two limitations should be recognized. They are as follows:

1. The study was based on an ex post facto design. Therefore, it was not possible to control or manipulate independent variables.
2. Since only nine elements were considered, the possible effect of other elements on the criterion is unknown.

With this background concerning the objectives of the study and procedures followed in collecting data, attention will be directed to findings that emerged from the study. Emphasis will be placed on the relationship that existed between the diffusion of cooperative agricultural occupations curricula and personal and situational variables in the school and community. To conceptualize findings of this study, programs have been grouped according to stages in the diffusion process. The stages include: interest, evaluation, trial, and adoption. The awareness stage is not used because it was assumed that all teachers were aware of the innovation through their participation in the Institute. It should be kept in mind that for the purpose of testing relationships between variables, diffusion scores (rather than stages of diffusion) were utilized.

The study revealed that four independent variables had a simple correlation with diffusion which is significant at the five percent level of confidence or better. They included: (1) the number of vocational agriculture teachers employed by the school, (2) the total number of students enrolled in vocational agriculture, (3) innovativeness of the teacher, and (4) the number of non-farm students enrolled in vocational agriculture. Let us take a closer look at these relationships, in order of their degree of relationship.

The number of vocational agriculture teachers employed by the school was most closely related to diffusion of cooperative agricultural occupations curricula into the program. The coefficient of correlation was .603 which is significant at the one percent level of confidence.

Of the schools included in the study, twenty-four had one teacher of vocational agriculture, seven had two, and one had three. Data in Table I show the distribution of the number of teachers of vocational agriculture in relation to stages of diffusion of the innovation. You will notice that all multiple-teacher departments were past the evaluation stage and a majority had adopted the innovation.

TABLE I

NUMBER OF VOCATIONAL AGRICULTURE TEACHERS BY STAGES OF DIFFUSION

Number of Teachers in Department	Diffusion Stages			
	Interest	Evaluation	Trial	Adoption
Single-Teacher Departments	9	7	5	3
Multiple-Teacher Departments	0	0	3	5

Two-thirds of the single-teacher departments were below the trial stage, and nearly 38 percent were only at the interest stage of the diffusion process. Only three of the twenty-four single-teacher departments had adopted the innovation.

The relationship that existed between the total number of students enrolled in the vocational agriculture program and diffusion was expressed by a coefficient of correlation of .585, which is significant at the one percent level. There was a range of 33 to 142 students enrolled in vocational agriculture among the schools included in the study.

Figure 1 shows the mean enrollment for departments when programs are grouped according to stages of diffusion. It can be observed that the mean enrollment increased as stages of diffusion increased. The mean enrollment for programs at the interest stage was 45.6 compared to an enrollment of 78.6 for programs at the adoption stage.

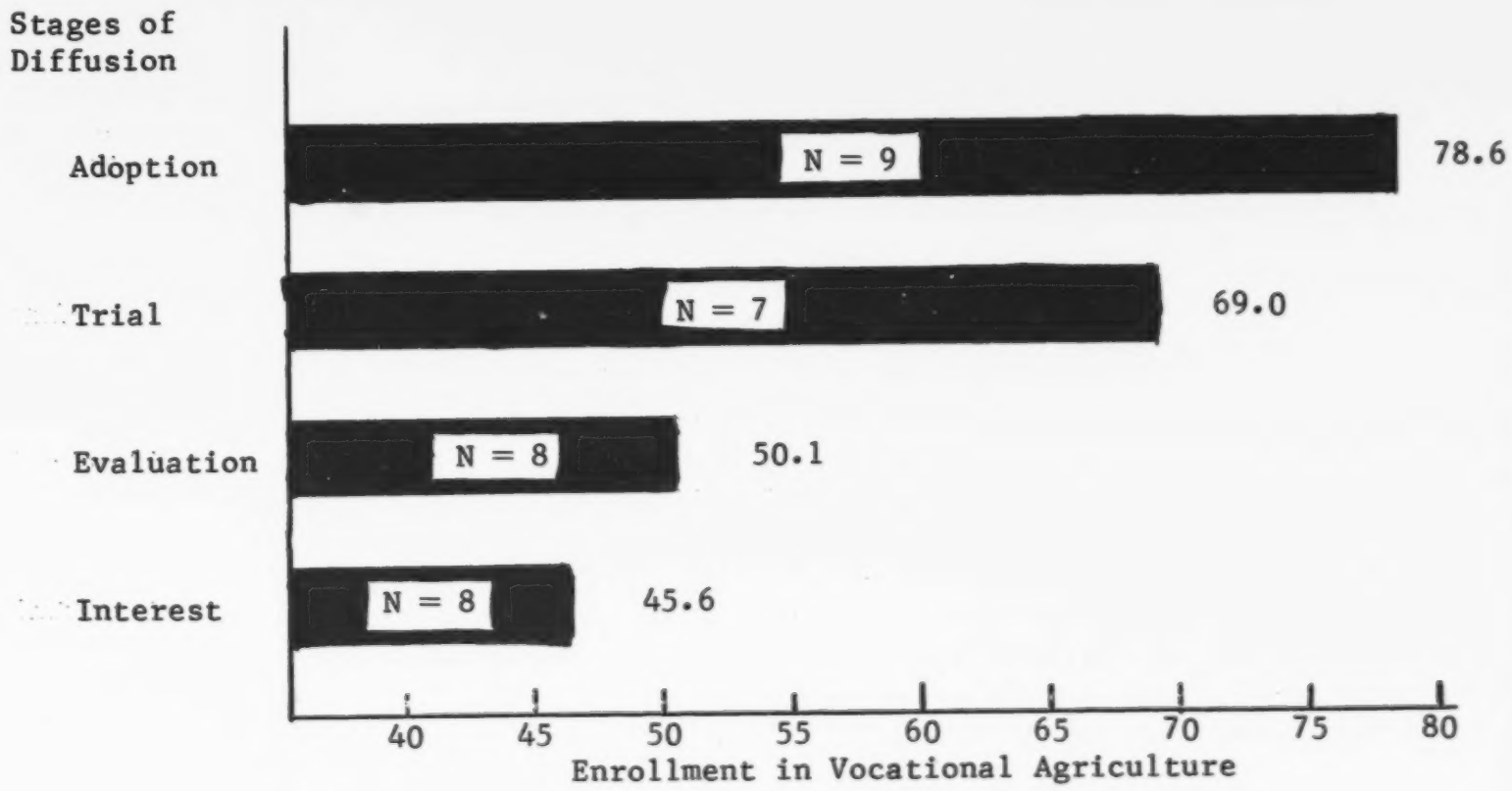

Figure 1. Enrollment in Vocational Agriculture by Stages of Diffusion

Innovativeness of the teacher was also closely related to diffusion. The coefficient of correlation was -.510, which is significant at the one percent level of confidence. This correlation was negative because the lower the score, the more innovative the teacher. In other words, innovativeness is the average length of expired time (years) for a teacher to adopt an innovation.

Figure 2 will help to visualize the relationship between teacher innovativeness and diffusion of the innovation. With the exception of programs at the interest stage, the mean number of years that expired before a teacher adopted an innovation decreased as level of diffusion increased. The mean teacher innovativeness score for programs in the adoption stage was 13.0. The greatest mean teacher innovativeness score (27.5) was for programs in the evaluation stage.

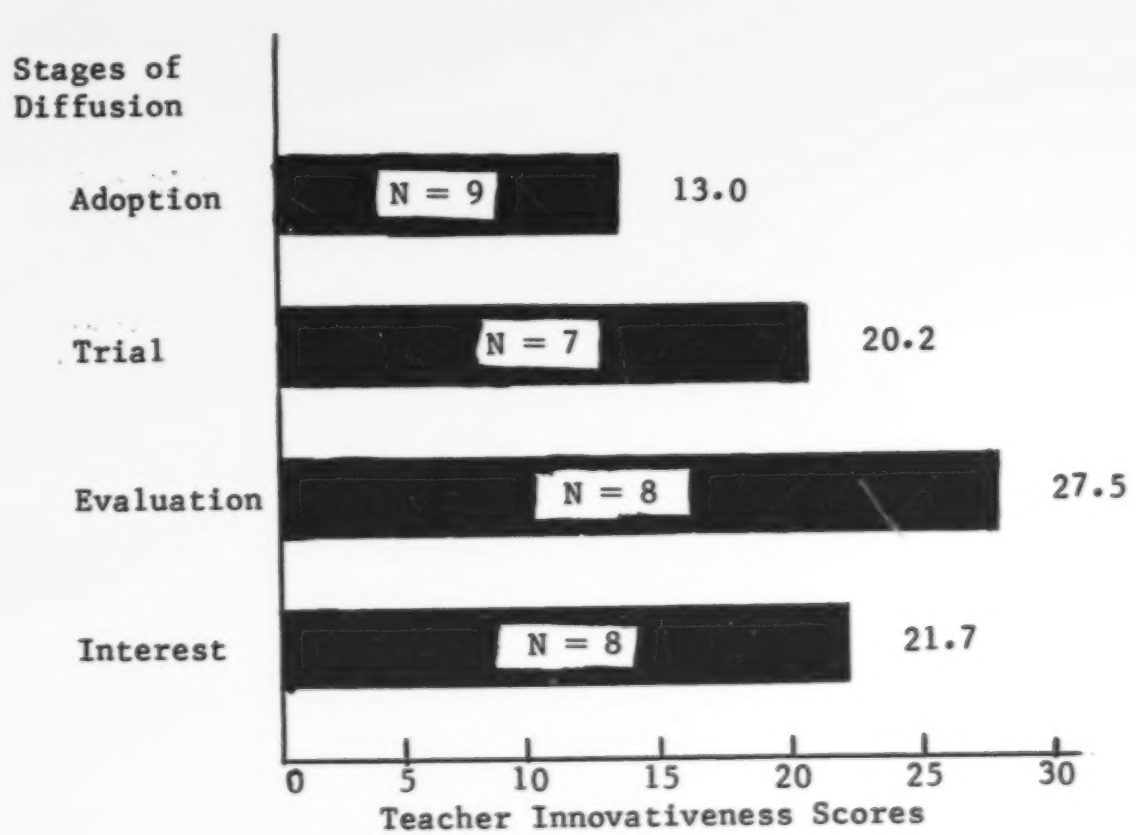

Figure 2. Teacher Innovativeness by Stages of Diffusion

A significant correlation (.465) also existed between the number of non-farm students enrolled in vocational agriculture and diffusion of cooperative agricultural occupations curricula. This correlation was significant at the one percent level.

A non-farm student was defined as a student whose parents earned less than fifty percent of the family's net income from production agriculture. The mean total enrollment in vocational agriculture for departments included in the study was 60.69 and the mean non-farm enrollment was 41.38

Figure 3 shows that non-farm enrollment increased as stages of diffusion increased. The mean enrollment for programs in the interest stage was 30.4 compared to a mean enrollment of 57.0 for programs where the innovation had been adopted.

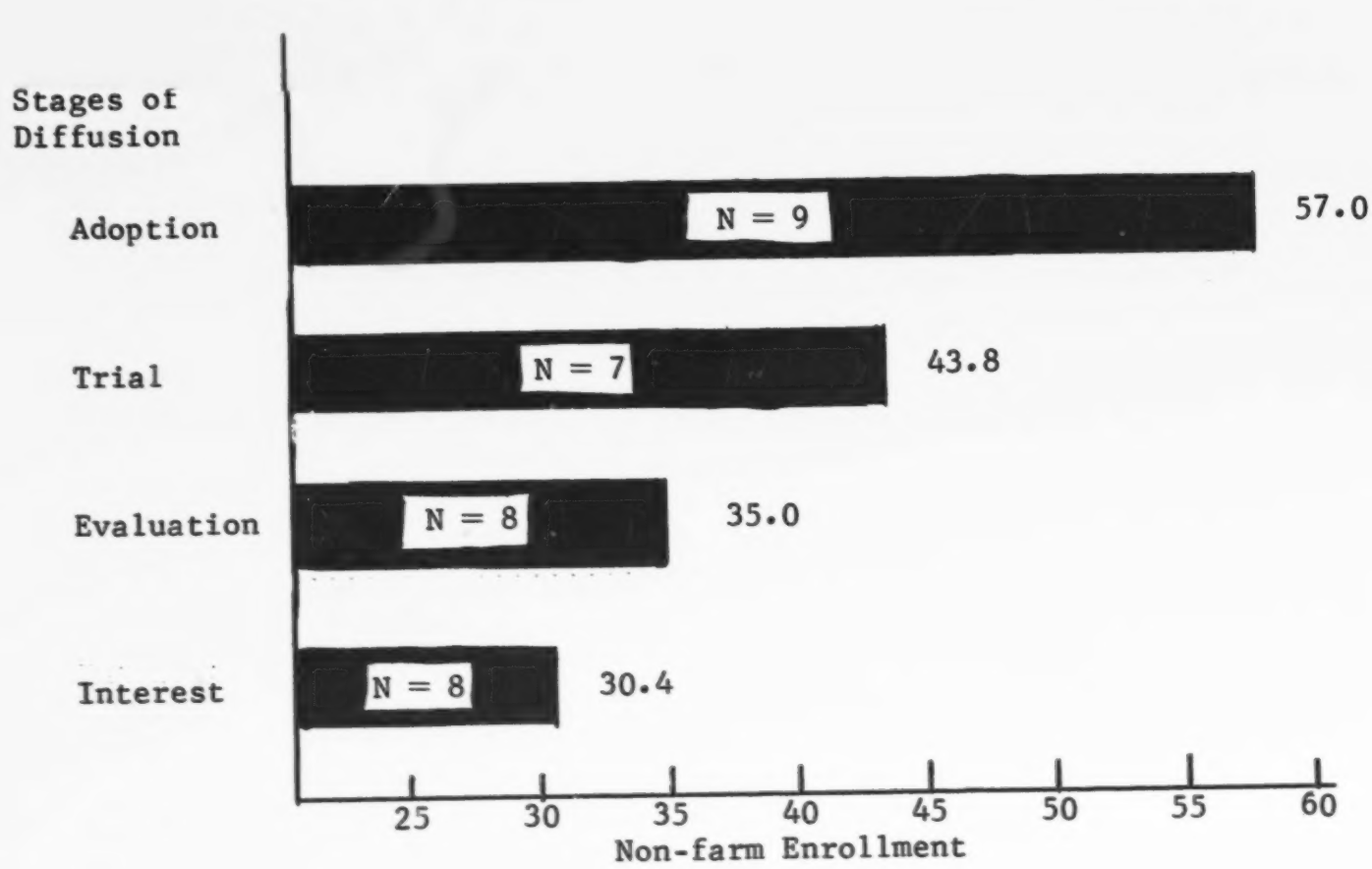

Figure 3. Non-farm Enrollment in Vocational Agriculture by Stages of Diffusion

The variables considered in this study that were significantly related to the diffusion of cooperative agricultural occupations curricula have been discussed. Perhaps it would also be beneficial to observe the relationships between independent variables and diffusion which were not significant. Independent variables which were not significantly related to diffusion included: (1) administrator's attitude toward cooperative agricultural occupations training, (2) the offering of a separate agricultural mechanics class in the vocational agriculture department, (3) the school's per pupil expenditure, (4) the number of agricultural training stations available in the community, and (5) the number of vocational programs offered by the school.

Of all the independent variables considered, the administrator's attitude toward the innovation had the least relationship (.136) with diffusion. Figure 4 reveals that, in general, administrators were highly favorable to cooperative agricultural occupations training which

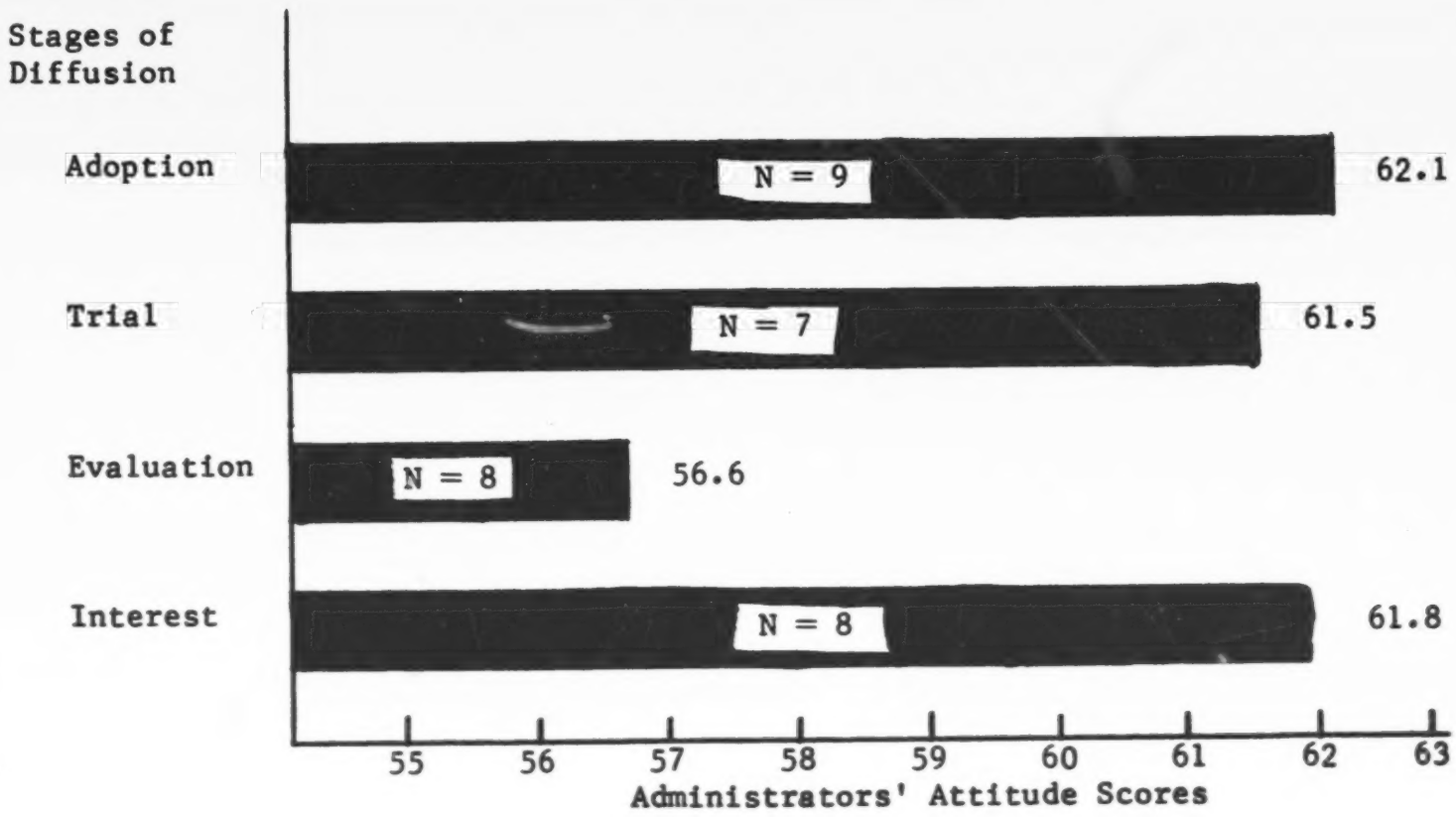

Figure 4. Administrators' Attitude Scores by Stages of Diffusion

accounts for the low relationship. The attitude scores ranged from 48 to 78 points with a possible score of 88 and a mean of 60.71.

The fact that no significant relationship existed between the offering of a separate agricultural mechanics class and diffusion can be conceptualized by the data in Table II. Of the 14 programs offering a separate agricultural mechanics class, eight were in the trial or adoption stage. However, there were also eight of the 18 programs not offering a separate class which were at the trial or adoption stage.

TABLE II

OFFERING OF SEPARATE AGRICULTURAL MECHANICS CLASS BY STAGES OF DIFFUSION

Offer Separate Agricultural Mechanics Class	Stages of Diffusion			
	Interest	Evaluation	Trial	Adoption
No	5	5	4	4
Yes	4	2	4	4

The school's per pupil expenditure was also not significantly related to diffusion of cooperative agricultural occupations curricula. This lack of relationship is easily visualized in Figure 5 which shows the mean school's per pupil expenditure for programs in the various stages of diffusion.

The range in expenditure per pupil was great--$321.12 to $676.47, with a mean of $442.07. However, when programs were divided into stages of diffusion, there was very little variation in the school's per pupil expenditure.

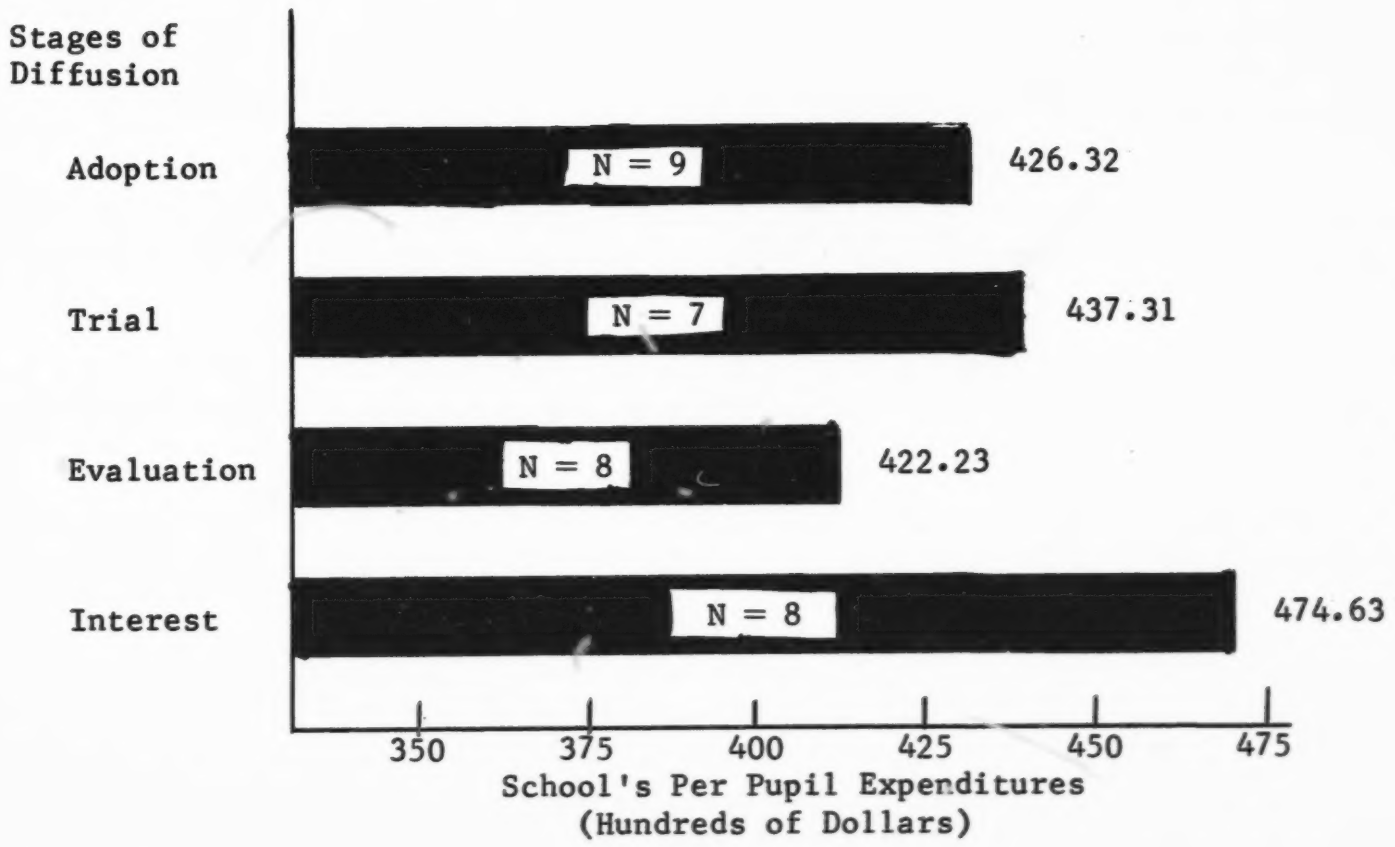

Figure 5. School's Per PupilExpenditure by Stages of Diffusion

The number of businesses in the community, as identified by the teacher of vocational agriculture as potential training stations, ranged from 2 to 28, with a mean of 13.09. Figure 6 reveals that as diffusion increases the mean number of training stations available tended to increase, with the exception of programs at the evaluation stage. However, the correlation between the number of agricultural training stations available and diffusion of the innovation was not significant at the five percent level.

The study did not reveal any significant relationship between the number of vocational programs offered by the school and diffusion of cooperative agricultural occupations curricula. Figure 7 shows very little variation in the mean number of vocational courses offered in the schools and programs at the various stages of diffusion. The number of vocational programs offered by the schools included in the study ranged from one to ten, with a mean of 3.21

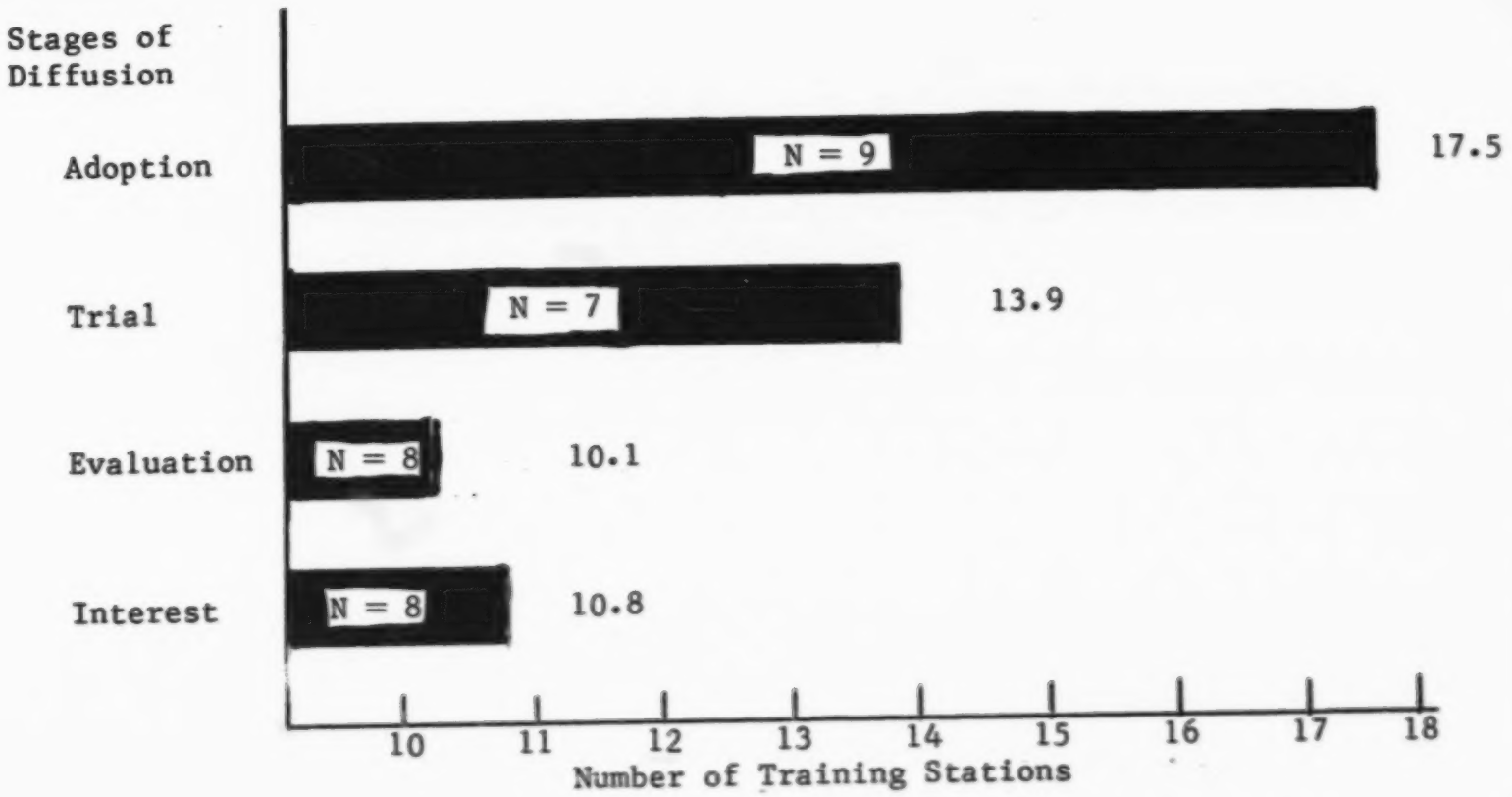

Figure 6. Number of Training Stations Available by Stages of Diffusion

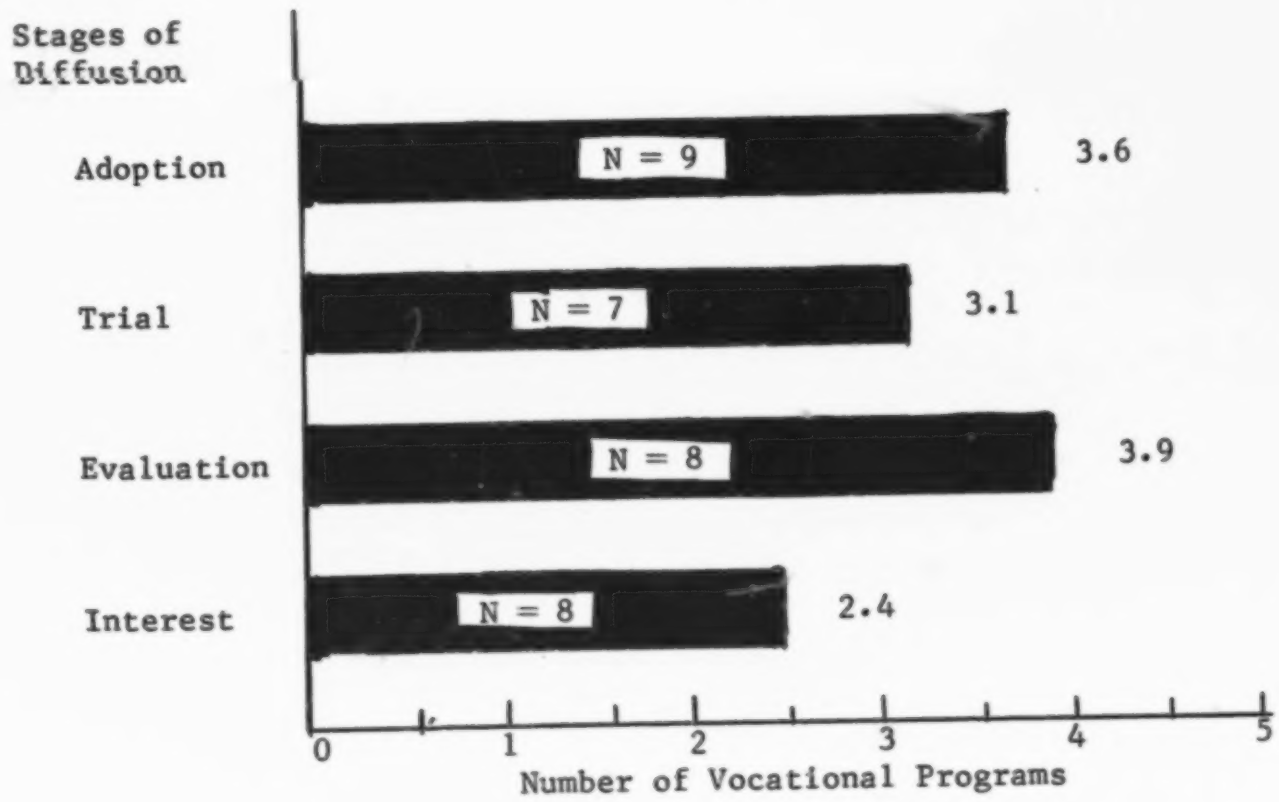

Figure 7. Number of Vocational Programs Offered by Stage of Diffusion

It is interesting to note that in seven schools agriculture was the only vocational program offered, and that none of these had adopted cooperative agriculture occupations curricula.

Up to this point attention has been directed to the relationship that existed between independent variables and diffusion of the innovation. Focus will now be placed on examining the amount of variation in diffusion accounted for by independent variables. Variation accounted for by each variable was determined using multiple regression analysis which takes into account the intercorrelation among the independent variables.

Table III shows the extent to which the variation away from the mean diffusion score was explained by the independent variables. The variables as listed accounted for 70 percent of the variation.

The number of teachers in the vocational agriculture department accounted for 36.4 percent of the variation in diffusion of the innovation. This one variable accounted for slightly more than one-half of all the variation accounted for by all nine independent variables considered in the study.

Innovativeness of the teacher claimed an additional 15.2 percent of the variation. Additional variation accounted for by other independent variables, in the order they were entered into the multiple regression equation, are: (1) offering of separate agricultural mechanics class, 3.8 percent; (2) number of non-farm students enrolled in vocational agriculture, 3.1 percent; (3) administrator's attitude toward the innovation, 5.0 percent; (4) number of students enrolled in vocational agriculture, 1.9 percent; (5) school's per pupil expenditure, 2.3 percent; and (6) number of training stations available in the community, 2.4 percent.

The number of vocational education programs offered by the school did not account for any of the variation.

TABLE III

RESULTS OF REGRESSION ANALYSIS

Order of Entry into Regression Analysis	Variable Name	Percentage of Variance Accounted for by each Variable	Cumulative Percentage of Variance Accounted for by Variables
1	Number of Teachers	36.4	36.4
2	Innovativeness of Teachers	15.2	51.6
3	Offering of Agricultural Mechanics	3.8	55.4
4	Non-farm Enrollment	3.1	58.5
5	Administrator's Attitude	5.0	63.5
6	Enrollment in Vocational Agriculture	1.9	65.4
7	Expenditures Per Pupil	2.3	67.7
8	Number of Training Stations	2.4	70.1
9	Number of Vocational Programs	0.0	70.1

Based on the findings of this study, the following conclusions emerge as being of particular importance:

1. Schools with a multiple-teacher vocational agriculture department will probably be more successful in the implementation of cooperative agricultural occupations curricula

than schools with single-teacher departments.

2. The more students enrolled in vocational agriculture, the greater the probability of cooperative agricultural occupations curricula being diffused into the program.
3. The more innovative the teacher of vocational agriculture, the greater the probability of cooperative agricultural occupations curricula being diffused into the program.
4. The more non-farm students enrolled in vocational agriculture, the greater the probability of cooperative agricultural occupations training being diffused into the program.
5. The following factors do not appear to seriously inhibit the diffusion of cooperative agricultural occupations curricula: (1) administrator's attitude, (2) school's per pupil expenditure, (3) number of agricultural training stations available in the community, (4) offering of separate agricultural mechanics class, and (5) number of vocational education programs offered by the school. However, since each of these variables, except the number of vocational education programs offered by the school, accounted for additional variation in the criterion, they should be considered when predicting diffusion of cooperative agricultural occupations curricula.

Hopefully, as the findings of this study have been presented, you have been able to make implications to teacher-education and supervision. It is the opinion of the speaker that the following statements are worthy of consideration.

1. A greater number of multiple-teacher departments need to be established to effectively expand the vocational agriculture program by adding cooperative agricultural occupations curricula.
2. Schools with large enrollments in vocational agriculture, and large non-farm enrollments should be encouraged to supplement traditional agricultural production curricula with cooperative agricultural occupations training.
3. State staff personnel should consciously and deliberately identify and use the more innovative teachers to conduct pilot cooperative agricultural occupations training programs, and other purposeful changes in agricultural education.
4. State staff personnel should be more positive in their recommendations and exert greater leadership in actively promoting adoption of cooperative agricultural occupations curricula as a supplement to the total vocational agriculture program.
5. Further research relating the diffusion and adoption processes to change and innovations is needed in agricultural education to make the change process less haphazard.